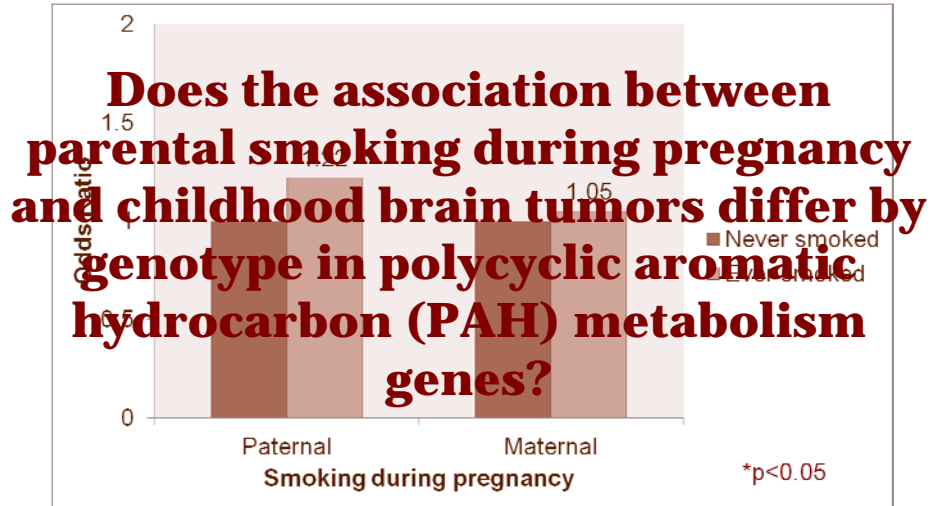# Parental Smoking and Childhood Brain Tumors

## A population-based case-control study of the role of functional polymorphisms

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**Parental smoking during pregnancy and risk of CBT**



**Does the association between parental smoking during pregnancy and childhood brain tumors differ by genotype in polycyclic aromatic hydrocarbon (PAH) metabolism genes?**

Boffetta, 2000; Huncharek, 2002

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# Methods

- Subset of population based case-control study (202 Cases / 286 Controls)
- Smoking exposure (in-person interview):
  - Maternal: never/ever and by dose
  - Paternal: never/ever and duration of exposure
- Genotyping—archival newborn blood spots
  - 9 functional polymorphisms in 6 genes
- OR and 95% CI by logistic regression
  - Stratification and formal interaction tests

## Table 1. Parental smoking during pregnancy and risk of CBT

| Exposure | Cases N(%) N=149 | Controls N(%) N=210 | Adj. OR (95% CI) |
|---|---|---|---|
| No exposure to prenatal smoke | 104 (69.8) | 153 (72.9) | 1.00 |
| Father smoked during pregnancy | 45 (30.2) | 57 (27.1) | 1.03 (0.62, 1.71) |
| Father only | 25 (16.8) | 27 (12.9) | 1.24 (0.66, 2.35) |
| Father and other source (mother or other resident) | 20 (13.4) | 30 (14.3) | 0.82 (0.41, 1.63) |

| Exposure | Cases N(%) N = 125 | Controls N(%) N = 200 | Adj. OR (95% CI) |
|---|---|---|---|
| No exposure to prenatal smoke | 104 (83.2) | 153 (76.5) | 1.00 |
| Mother smoked during pregnancy | 21 (16.8) | 47 (23.5) | 0.55 (0.29, 1.05) |
| Mother only | 4 (3.2) | 12 (6.0) | 0.41 (0.12, 1.42) |
| Mother and other source (father or other resident) | 17 (13.6) | 35 (17.5) | 0.60 (0.30, 1.21) |

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## Table 2. Parental smoking, EPHX1 genotype and risk of CBT

|  | Exposure | Normal PAH Activity | | High PAH Activity | | |
|---|---|---|---|---|---|---|
|  |  | Cases/ Controls | Adj. OR (95%CI) | Cases/ Controls | Adj. OR (95%CI) | p-value for interaction |
| *Paternal Smoking* |  |  |  |  |  |  |
| EPHX1 H139R | Never | 107/144 | 1.00 | 44/82 | 1.00 | 0.07 |
|  | <3.5 hours | 12/18 | 0.74 (0.33, 1.65) | 12/15 | 1.32 (0.52, 3.34) |  |
|  | 3.5+ hours | 12/19 | 0.96 (0.42, 2.20) | 9/5 | 3.18 (0.92, 10.98) |  |
| *p for trend* |  |  | 0.71 |  | 0.07 |  |

|  | Exposure | Normal PAH Activity | | High PAH Activity | | |
|---|---|---|---|---|---|---|
|  |  | Cases/ Controls | Adj. OR (95%CI) | Cases/ Controls | Adj. OR (95%CI) | p-value for interaction |
| *Maternal Smoking* |  |  |  |  |  |  |
| EPHX1 H139R | Never | 123/149 | 1.00 | 52/87 | 1.00 | 0.003 |
|  | 1-10/day | 3/18 | 0.17 (0.05, 0.62) | 2/8 | 0.28 (0.05, 1.50) |  |
|  | 11+/day | 5/14 | 0.46 (0.15, 1.41) | 11/7 | 2.19 (0.72, 6.63) |  |
| *p for trend* |  |  | 0.02 |  | 0.38 |  |

## Exposure to paternal smoking and risk of CBT by genotype for EPHX1 H139R
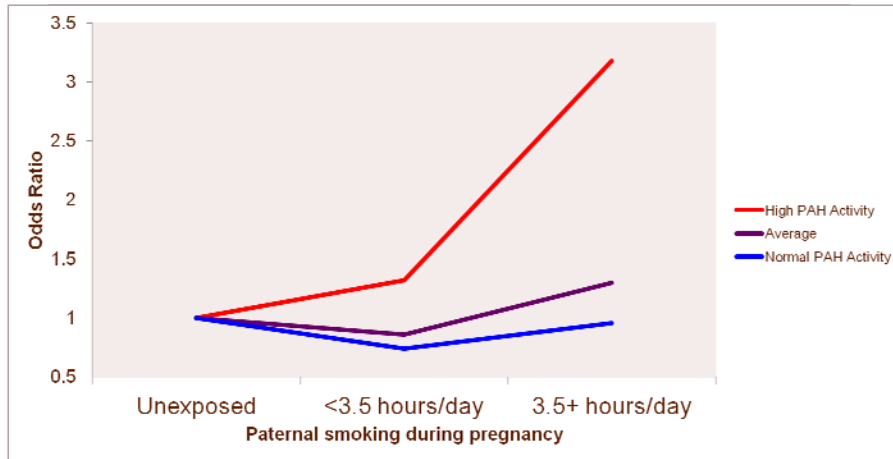
# Conclusion

- Modest association between paternal smoking and CBT risk

- CBT risk associated with paternal smoking is greater in children with high activity EPHX1 genotype

- Environmental risk factors for CBT may be better detected when considering genetic background

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# Parental smoking and risk of CBT by genotype